

Article

GDP revisions in Blue Book: 2023

GDP revisions in annual and quarterly rounds, focusing on revisions in Blue Book 2023. Compares revisions before and during the coronavirus (COVID-19) pandemic.

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1 . Main points

- We are transparent in showing revisions to UK gross domestic product (GDP) estimates; we publish real-time estimates of GDP and revisions triangles that show whether there is a bias in early estimates of GDP, while also providing commentary on the revisions performance of UK GDP.
- Average quarterly GDP revisions from Quarter 1 (Jan to Mar) 1997 to Quarter 2 (Apr to June) 2023 in Blue Book 2023 were smaller than in the last two Blue Books; however, revisions were larger throughout 2020 and 2021, reflecting the higher levels of data uncertainty because of the coronavirus (COVID-19) pandemic.
- Revisions to 2020 and 2021 annual GDP were larger than normal; however, this is not the case if you consider the size of the movements in GDP over this period, where the relative revisions over 2020 and 2021 are much more comparable with those prior to the pandemic.
- One of the main explanations for revision to initial estimates of GDP in the pandemic was the introduction of intermediate consumption estimates that capture the inputs that are used as part of the production process.
- This article focuses on GDP revisions over 2020 and 2021 and how they compare with those in the pre-pandemic period; we will continue to review the revisions performance of 2022 and beyond in future articles as data vintages mature.

2 . Overview of revisions

There is a trade-off between the timeliness and accuracy of estimates of gross domestic product (GDP). As additional information becomes available, we have a more complete picture of economic activity in that period. This production cycle can take up to three years and naturally leads to revisions in our estimates of GDP. The annual Blue Book process is also when major methodological improvements are introduced in a consistent and co-ordinated way.

To assess revision performance of our GDP estimates, we can estimate:

- the mean revision (MR), which shows whether there is a systematic tendency for initial estimates to be revised upwards or downwards
- the mean absolute revision (MAR), which measures the absolute size of revisions so that upward revisions are not offset by downward revisions of the same magnitude
- the mean square revision (MSR), which incorporates the degree of bias and the variance of the revision, as large revisions are treated more seriously than small revisions

This article analyses the revisions to our quarterly GDP estimates that were published in our [UK National Accounts, The Blue Book: 2023 publication](#).

3 . Revisions in Blue Book 2023

Figure 1 shows the revisions to volume estimates of the quarterly change in gross domestic product (GDP) as part of implementing our annual national accounts, or "Blue Book". In Blue Book 2023, there was a mean revision (MR) of 0.03 percentage points to our estimates of the quarterly change in GDP over the period Quarter 1 (Jan to Mar) 1997 to Quarter 2 (Apr to June) 2023, and a mean absolute revision (MAR) of 0.09 percentage points.

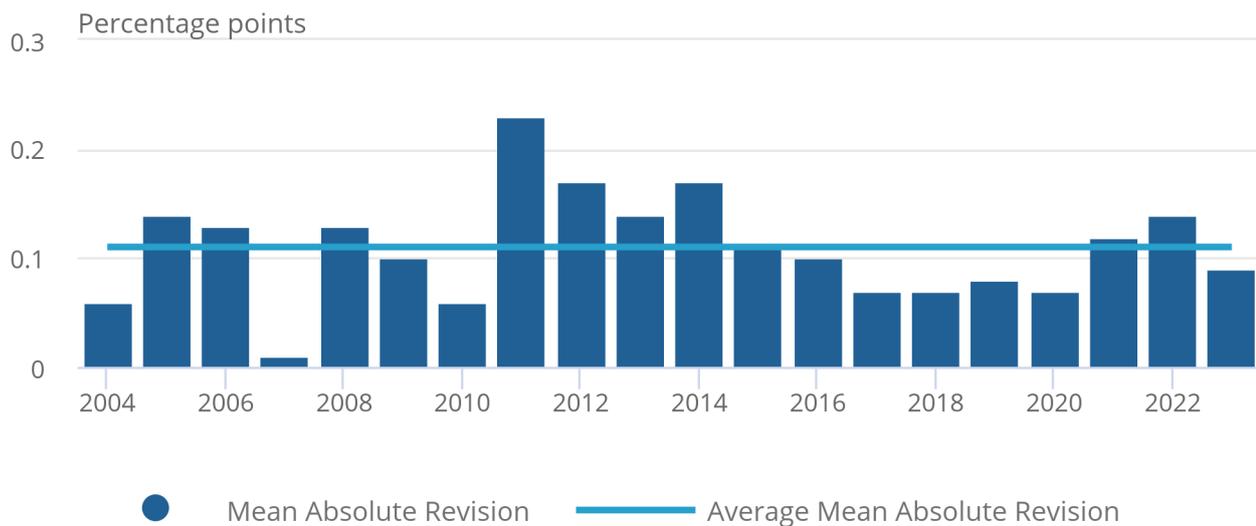
Figure 1 would typically be an appropriate proxy of the impact of the revisions in a Blue Book, if there was a similar revision to the change in GDP for all periods. However, this was not the case in Blue Book 2023, as revisions were higher during the coronavirus (COVID-19) pandemic of 2020 and 2021. This reflected the expected higher levels of data uncertainty. For example, the MR over the period Quarter 1 2020 to Quarter 4 (Oct to Dec) 2021 was 0.21 percentage points, while the MAR was 0.24 percentage points.

Figure 1: Revisions to quarterly volume GDP in Blue Book 2023 were slightly lower than recent historical revisions

Mean absolute revision to quarterly volume GDP, Blue Book 2004 to Blue Book 2023, UK

Figure 1: Revisions to quarterly volume GDP in Blue Book 2023 were slightly lower than recent historical revisions

Mean absolute revision to quarterly volume GDP, Blue Book 2004 to Blue Book 2023, UK



Source: Office for National Statistics

Notes:

1. The revisions in each Blue Book relate to the period from Quarter 1 (Jan to Mar) 1997 to the latest quarter available in that publication. For example, the Blue Book 2023 revisions reflect those between the August 2023 and September 2023 vintages of quarterly estimates of volume GDP, including up to Quarter 2 (Apr to June) 2023.
2. The x-axis refers to that Blue Book publication, reflecting the mean absolute revision (MAR) to quarterly volume estimates of GDP from Quarter 1 1997 onwards.

We publish monthly snapshots of quarterly GDP, allowing comparison between a first estimate of quarterly GDP with one that is published months later. Our focus is on those estimates published 3, 24 and 36 months after the first estimate of quarterly GDP, reflecting the three-year production cycle of UK GDP.

Table 1 shows that there is a zero mean revision (MR) at t plus three months over the period Quarter 1 1961 to Quarter 4 2020, implying that there is no tendency for the first estimate to be revised up or down. That said, the revisions performance has not been constant over time, where revisions have tended to be larger in earlier periods and around turning points in the economy, where uncertainty is likely to be more pronounced.

Table 1 shows that the MR is a little higher when comparing the first published quarterly estimate with the estimate published three years later. This analysis continues to show that while initial revisions (t plus three months) are not statistically significant, the revisions that reflect the supply and use tables (SUTs) balancing process (t plus 36 months) are now marginally [statistically significant](#) over the full timespan.

Table 1: There is some evidence that revisions are marginally statistically significant when looking at the final quarterly estimate of GDP
Revision information and t-test for statistical significance for quarterly GDP growth, UK, Quarter 2 1961 to Quarter 4 2020

Timespan	T + 3				T + 36			
	Mean Revision (pp)	Absolute Average Revision (pp)	T Score [note 2]	Statistically Significant?	Mean Revision (pp)	Absolute Average Revision (pp)	T Score [note 2]	Statistically Significant?
1961 Q2 to 2020 Q4 [note 1]	0.0	0.2	1.9	No	0.1	0.5	2.3	Yes
1961 Q2 to 1969 Q4 [note 1]					0.1	0.8	0.4	No
1970 Q1 to 1979 Q4 [note 1]					0.3	1.0	1.3	No
1980 Q1 to 1989 Q4	0.1	0.3	1.6	No	0.2	0.7	1.4	No
1990 Q1 to 1999 Q4	0.0	0.1	0.4	No	0.1	0.2	2.6	Yes
2000 Q1 to 2009 Q4	0.0	0.1	0.2	No	0.0	0.3	0.0	No
2010 Q1 to 2020 Q4 [note 3]	0.1	0.1	1.6	No	0.1	0.2	1.4	No

Source: Office for National Statistics

Notes

1. Because of the compilation process at the time, t plus three months has no revisions pre-1980.
2. Two tailed standard significance test at 95% confidence interval.
3. We do not have a t plus 36 months estimate for Quarter 3 (July to Sept) 2020 and Quarter 4 (Oct to Dec) 2020. However, our revisions policy is such that these current estimates will not be revised before we get to the t plus 36 months stage and so this has been inferred for these purposes. These have gone through two supply and use tables (SUTs) balancing processes, which is the basis of the "final" estimate being chosen.

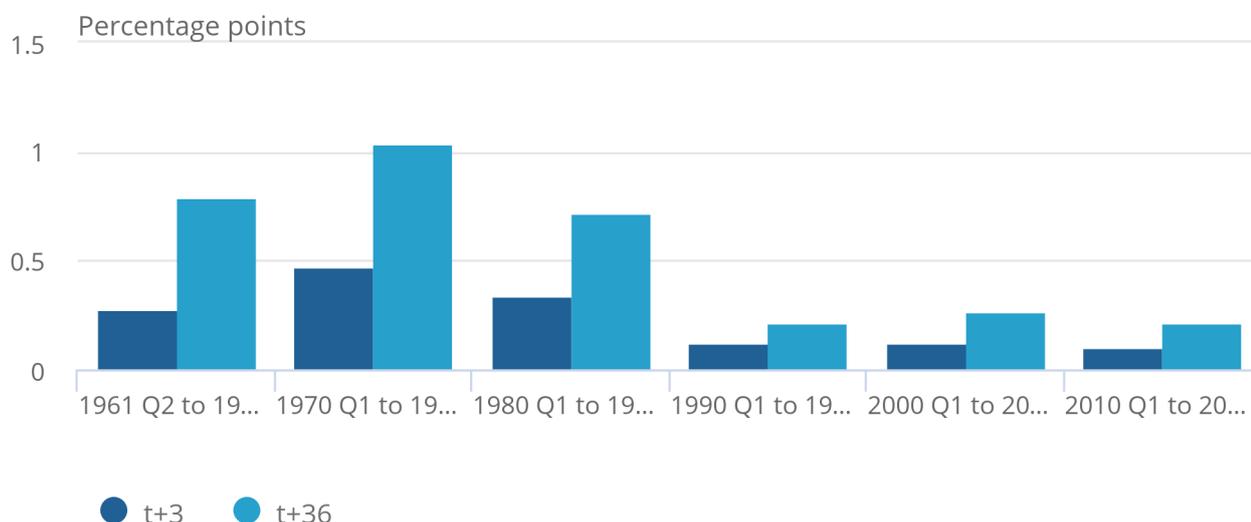
Figure 2 shows that the quality of early quarterly estimates has improved significantly over time. There have been improvements to the measurement of GDP as well as a lower degree of volatility in the UK economy, although the pandemic has proven to be an exception. Figure 2 shows that the MAR is larger at the three-year horizon for each of the last six decades. As additional information becomes available, the revision increases between t plus three months and t plus 36 months. However, the MAR is less in recent periods, including a reduction between these MAR revisions as later data are incorporated. It is likely that these revisions reflect the [impact of balancing](#) our full range of information in a SUT framework for the first time, and methodological improvements, which cannot be anticipated at the time of the first estimate.

Figure 2: The quality of early quarterly estimates of GDP has improved significantly over time

Mean absolute revision, Quarter 2 (Apr to June) 1961 to Quarter 4 (Oct to Dec) 1969, to Quarter 1 (Jan to Mar) 2010 to Quarter 4 2020, UK

Figure 2: The quality of early quarterly estimates of GDP has improved significantly over time

Mean absolute revision, Quarter 2 (Apr to June) 1961 to Quarter 4 (Oct to Dec) 1969, to Quarter 1 (Jan to Mar) 2010 to Quarter 4 2020, UK



Source: Office for National Statistics

Notes:

1. We do not have a t plus 36 months estimate yet for Quarter 3 (July to Sept) 2020 and Quarter 4 2020. However, our revisions policy is such that these current estimates will not be revised before we get to the t plus 36 months stage and so this has been inferred for these purposes. These have gone through two supply and use tables (SUTs) balancing processes, which is the basis of the “final” estimate being chosen.

4 . Performance of revisions before and during the coronavirus pandemic

Given the substantial impact of the coronavirus (COVID-19) pandemic on the economy, we proactively highlighted [uncertainty in our early estimates of gross domestic product \(GDP\)](#) throughout 2020 and 2021.

We have not been able to include the full effects of the pandemic in our revision analysis, as we do not yet have "final" quarterly estimates of volume GDP for 2021 or 2022.

Figure 3 shows the level of volume GDP in recent Blue Books, which shows how our understanding of the effects of the pandemic on the economy has evolved. The impact of Blue Book 2023 has been to revise up the level of GDP for 2020 and 2021, where these revisions brought us closer to the estimates published in Blue Book 2021. Figure 3 highlights the challenges around the higher levels of uncertainty over this period, particularly in Quarter 2 (Apr to June) 2020 and Quarter 2 2021. These quarters have seen the largest revisions within the annual upward revisions as we receive better information on economic activity in these periods.

The economy is estimated to have contracted by around one-fifth during Quarter 2 2020, when the first lockdown took place. This was the largest quarterly movement in GDP on record, while the challenges of measuring health and education output were also particularly uncertain at this time.

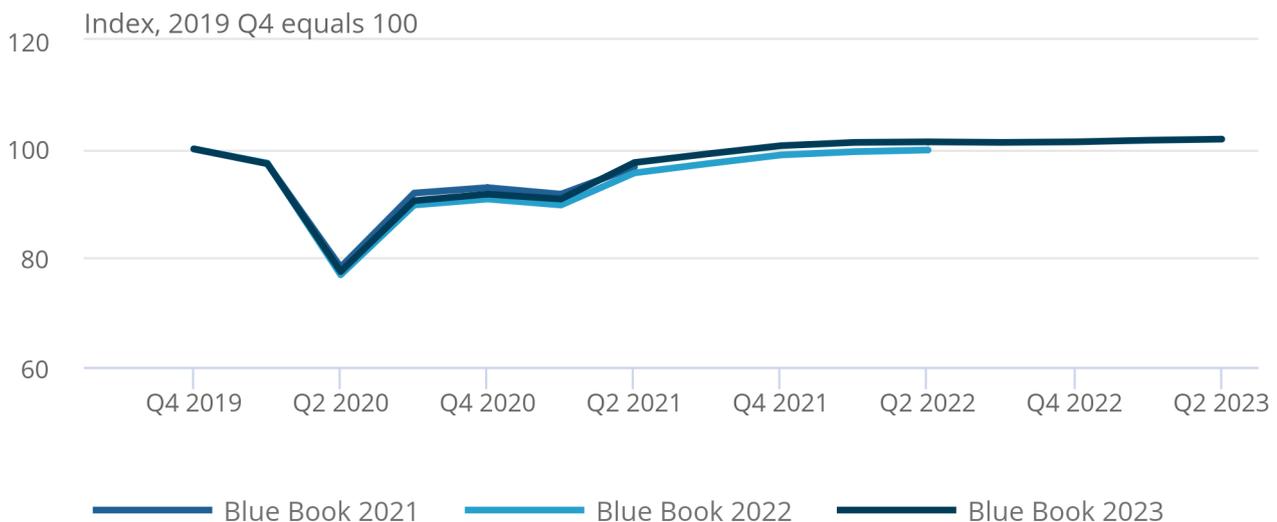
The effects of the reopening of the economy after the third lockdown took place in Quarter 2 2021. There was a large rebound in GDP on the quarter as households and businesses responded to the lifting of these public health restrictions. This also included the continued impacts on the provision of non-market output, including recording new activity for the first time, such as NHS Test and Trace and the vaccination rollout.

Figure 3: The Blue Book 2023 estimates of volume GDP are in line with earlier estimates

Real-time estimates of the level of volume of GDP, Quarter 4 (Oct to Dec) 2019 to Quarter 2 (Apr to June) 2023, UK

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Real-time estimates of the level of volume of GDP, Quarter 4 (Oct to Dec) 2019 to Quarter 2 (Apr to June) 2023, UK



Source: Office for National Statistics

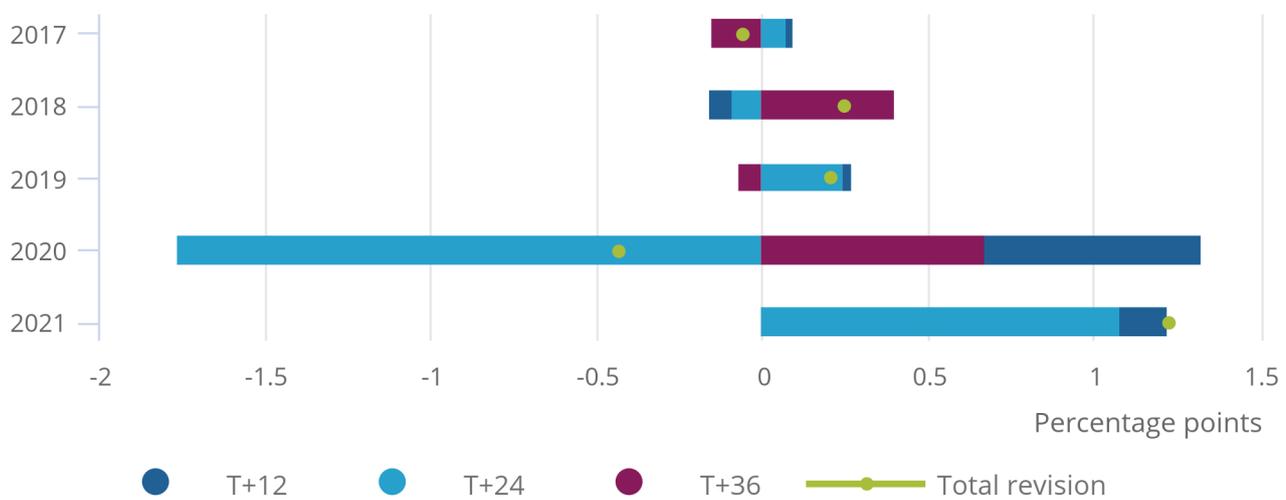
Figure 4 shows the revisions to annual estimates of GDP growth for 2017 to 2021. It shows the timing of the revisions over the three-year production cycle, which proxies the effects of initial data updates, and the first and second supply and use tables (SUTs) balancing process of the Blue Book process. Revisions to the annual change in GDP in the pre-pandemic period tended to be small. Figure 4 highlights the heightened levels of uncertainty, where revisions at the SUT balancing stage have been higher for 2020 and 2021 so far. However, it is important to realise that the changes in GDP in these years are more extreme.

Figure 4: Revisions to annual GDP growth are larger in the pandemic years of 2020 and 2021

Revisions to the annual growth rate of GDP at t plus 12 months, t plus 24 months and t plus 36 months, compared with the previous estimate for 2017 to 2021, UK

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Revisions to the annual growth rate of GDP at t plus 12 months, t plus 24 months and t plus 36 months, compared with the previous estimate for 2017 to 2021, UK



Source: Office for National Statistics

Notes:

1. For 2021, we do not yet have estimates for the t plus 36 months estimate, which will be available from September 2024. The revision for 2021 refers to that between the first estimate and the one published 24 months later instead.

Traditional revision indicators are comparable over time if there are not large movements in GDP. However, during the pandemic, we had the largest movements in GDP ever recorded. We recommend that revisions should be considered relative to the first estimate. It could be argued that a 0.1 percentage point revision matters much more when the annual growth rate is 1.4% than when it is, for example, minus 10.4%.

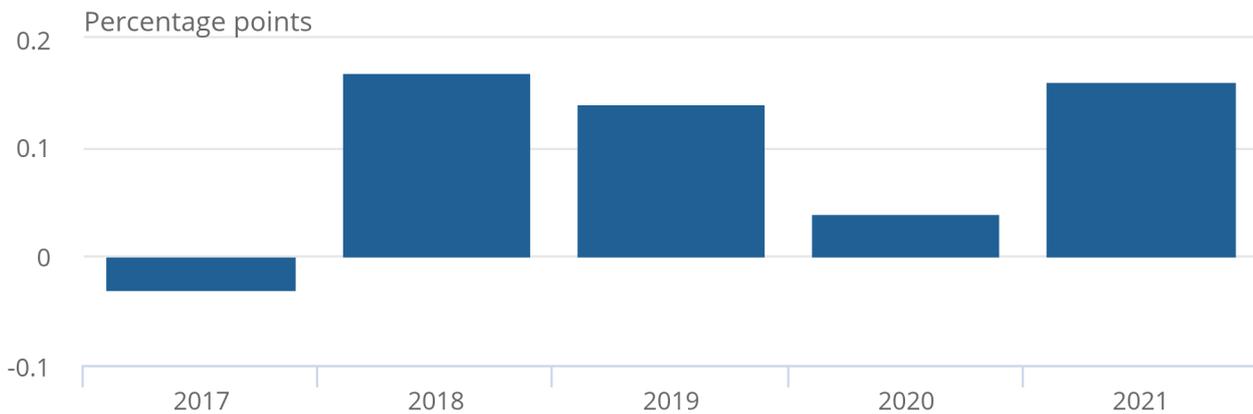
Figure 5 shows the revision between the first estimate of a year and subsequent estimates, as a proportion of the initial estimate of the change in GDP. This shows that the larger overall revisions seen in 2020 and 2021 are not out of proportion with the pre-pandemic period.

Figure 5: Relative revisions to GDP show that the pandemic revisions of 2020 and 2021 were similar to the pre-pandemic period

The revision to the annual growth rate between the first estimate and the estimate at t plus 36 expressed as a proportion of the original estimate, 2017 to 2021, UK

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The revision to the annual growth rate between the first estimate and the estimate at t plus 36 expressed as a proportion of the original estimate, 2017 to 2021, UK



Source: Office for National Statistics

We have been looking for any data or process improvements to help improve revision performance for future years. One of the main causes of revision in 2020 and 2021 is the updating of intermediate consumption ratios.

Early estimates are based on the change in output being an appropriate proxy for the change in gross value added. We take the ratio of intermediate consumption to output from the last fully balanced year, which then gets replaced by an updated intermediate consumption ratio when the next SUTs are published. For instance, the first estimates of GDP of 2020 were based on a pre-pandemic intermediate consumption ratio. The correct intermediate consumption ratios for that year were only applied when 2020 itself was fully balanced.

During the pandemic, the intermediate consumption ratios changed significantly from year-to-year. Therefore, this proxy relationship did not hold for some industries. Even a relatively small-sounding change of 1 percentage point in the intermediate consumption ratio between years can have a significant impact on GDP, and the changes seen within individual industries were much larger. Despite some interventions in areas such as health, and hotels and restaurants, it was not possible to anticipate the scale of change in these ratios. This is because we do not have a quarterly data source for intermediate consumption.

5 . Future developments

Revisions are a natural part of statistical compilation and there is a balance between timeliness and accuracy, making the best use of the data available at the time. The Office for National Statistics (ONS) continue to publish full revisions performance information for gross domestic product (GDP) and its components in a timely and transparent manner.

The substantial impacts of the coronavirus (COVID-19) pandemic during 2020 and 2021 highlighted challenges in the measurement of intermediate consumption for sectors of the economy.

We believe that we could improve the overall revisions performance of our early estimates of GDP if we could bring in timely information on intermediate consumption. We are currently investigating how this can happen. We are also reviewing if we can improve how we communicate uncertainty in early estimates of GDP and will publish further information on this in due course.

6 . Glossary

Gross domestic product (GDP)

A measure of the economic activity produced by a country. The three approaches used to measure GDP are the:

- output approach
- expenditure approach
- income approach

A more [detailedglossary](#) is available.

7 . Data sources and quality

More information about strengths and limitations of national accounts data used in the Blue Book can be found in our [Gross domestic product \(GDP\) Quality and Methodology Information \(QMI\)](#).

8 . Related links

[UK National Accounts, The Blue Book: 2023](#)

Compendium | Released 31 October 2023

National accounts statistics including national and sector accounts, industrial analyses, and environmental accounts.

9 . Cite this article

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